

## ABSTRACT OF THE DISCLOSURE

The present invention provides for an NO<sub>x</sub> adsorber aftertreatment system for internal combustion engines which utilizes a parallel arrangement of an adsorber catalyst and a bypass. The exhaust flow from the engine is routed through the adsorber during lean operation. At a predetermined regeneration time (for example, when the adsorber catalyst is 20% full), the exhaust gas flow is reduced through the parallel leg that contains the adsorber catalyst to be regenerated (e.g., 20% through the catalyst leg, 80% of the flow to the bypass leg). A quantity of hydrocarbon is injected into the reduced-flow catalyst leg in order to make the mixture rich. Since the flow has been reduced in this leg, only a small fraction of the amount of hydrocarbon that would have been required to make the mixture rich during full flow is required. This will result in a substantial reduction in the fuel penalty incurred for regeneration of the adsorber catalyst. Once the leg has been regenerated, the exhaust flow is switched to flow 100% through the adsorber leg.